UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: Kuang Y Lin *Art Unit:* 1725

In re:

Applicant: Bernhard KERN

Serial No.: 09/862,803

Filed: May 22, 2001

BRIEF ON APPEAL

October 25, 2006

COMMISSIONER FOR PATENTS
P O BOX 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection of claims 1-7 by the primary Examiner.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
On 10/26/06

Real Party of Interest

The real party of interest is Kern Magnesium - Giesstechnik GmbH, with a business address of Ikerusstrasse 8, D-04335 Schkeuditz OT Gleisen, Germany.

Related Appeals and Interferences

No appeals or interferences or judicial proceedings known to appellant, the appellant's legal representative or assignee which may be related to, directly affect, or be directedly affected by or having a bearing on the Board's decision in the pending appeal are known to the appellant.

Status of Claims

The present application contains claims 1-7.

All claims were rejected by the Examiner in the final Office Action.

Status of Amendments

A Request for Reconsideration was filed on May 8, 2006 after the Final Action in the above identified application.

Summary of Claimed Subject Matter

The present invention deals with a method for producing light metal castings. The metal which is used for producing the light metal castings, such as for example magnesium or magnesium alloys is heated in a casting retort 1 by heating means 2 to approximately 630°C. The shaping of the casting retort 1 is formed so that it reduces toward a feed system 4. In the lower region toward the feed system 4 the heating means 2 is arranged around the casting retort 1. The shape of the casting retort 1 and the arrangement of the heating means 2 in its lower regions make possible the production of the required temperature conditions for the melting and feeding process. Because of the conical shape of the casting retort 1 and its arrangement on a base body 5, the required distance and the withdrawal of the heat energy for solidification of the material is realized.

The heating means 2 can be formed as resistance heating, infrared heating, or induction heating. The narrowing structure of the casting retort 1 is placed on the base support 5. The outlet 5 of the casting retort 1 is located therefore flush over an opening in the base support 5 and is closed by a valve unit 3. A casting mold 19 is arranged under the base support 5 so that it is movable vertically and in a horizontal plane. It is connected with an evacuating device 20. After the evacuation

the valve unit 3 is removed by a valve control 12 via a mechanical connecting member 13 from the opening, and the supply of liquid metal into the mold nest of the casting mold 19 is released. The supply of the liquid metal, in particular for additional supply during the manufacture of serial light metal castings to the casting retort 1 is performed via a metal supply 18 from a pre-melting oven 16.

A check valve 17 prevents a return flow of liquid metal as well as pressure equalizaiton. The check valve 17 can be arranged in connection with the metal supply conduit 18 inside the pre-melting oven 16 or in connection with the metal supply conduit 18 inside the casting retort 1. The arrangement of the check valve 17 inside the casting retort 1 provides for the advantage of pressure freedom in the metal supply conduit 8. Gas supply is performed inside the closed system through a protective gas supply conduit 8 by a pressure intensifier 9. The pressure intensifier 9 supplies a protective gas and then withdraw it after the manufacturing process.

A control unit is arranged on the protective gas supply conduit 8 and serves for providing a constant pressure. Eventually occurring pressure losses due to gas losses at untight locations are compensated by a protective gas additional supply 10, for example a

protecting gas cylinder. The valve control 12 is formed as a pneumatic or hydraulic control. A "sudden" (short-term) opening of the valve unit 3 actuated by a valve locking device 14 and thereby is a pore formation of the material of the light metal casings is prevented.

In the melting device formed as the casting retort 1, the heating means 2 is arranged around the lower narrowing part. The valve unit 3 closes the opening at outlet part of the casting retort 1 to the casting mold 19. After the performed evacuation by the evacuation device 2 the short term opening of the valve unit 3 is performed through the valve control 12 and the valve lock 14. Thereby the liquid metal flows into the casting mold 19. During the expansion of the metal quantity for each part to be cast, because of the metal losses in the casting retort 1, a multiple of the metal quantity of the part is required. After the supply of the liquid metal into the feed system 4 the solidification process is performed by the withdrawal of the thermal energy through the base support 5 and the automatic withdrawal of the casting mold 19 from the feed system 4. The casting retort 1 inside the casting component group is surrounded by a thermal insulation 6. The available melting temperature is detected by the temperature sensor 7 and the corresponding signal is supplied to the valve control 12.

Figure 3 shows a second variant of the design of the casting mold and the differential pressure system of the inventive device. In this variant the casting retort 1 has a cylindrical shape. The heating means 2 is arranged around the lower cylindrical part of the casting retort 1. The required temperature difference for the solidification process between the feed system 4 and the casting mold 19 is provided by the thermal insulation 6 and the withdrawal of the casting mold 19 after the supply of the liquid metal. The supply of the protective gas is performed in this variant by a differential pressure system. It is composed of a storage 21 and a pump system 22 for supply and withdrawal of the protective gas.

This is essentially disclosed on pages 7-10 of the application and shown in Figures 1-3.

Grounds for Rejection to be Reviewed on Appeal

In the Final Office Action the Examiner rejected the claims under 35 U.S.C. 112, second paragraph as being indefinite. Therefore, the first ground of rejection to be reviewed on appeal is whether claims 1-7 are rejectable under 35 U.S.C.112, second paragraph, for the reasons stated by the Examiner.

In the Office Action the claims were rejected under 35 U.S.C. 103(a) over the German patent document '865 to Callihan and further in view of the patent document to Jorn, et al, Blum, et al, Muller or Japanese patent document '559.

The second ground for rejection is whether the claims are rejectable over the combination of the reference applied by the Examiner in the sense of 35 U.S.C. 103(a).

Argument

It is believed to be advisable first of all to explain in detail the method of producing line metal castings in accordance with the present invention with reference to claim 1.

Claim 1, the broadest claim on file, specifically defines a method of producing light metal castings composed of magnesium or magnesium alloys, comprising the steps of

supplying a liquid metal first to a casting retort;

pumping gas under pressure into the casting retort so as to press the liquid metal into a preliminarily evacuated casting mold;

performing a production process continuously in a closed loop without interruption of individual casting process with a pressure differential between the casting retort and the casting mold;

heating of the liquid metal in a lower part of a melting device which adjoins a feed system;

after reaching a melting temperature approximately 630°, providing a connection of between said casting retort and said casting mold through a valve system over a short time without connection with outside;

selecting a quantity of the supplied liquid light metal to be a multiple of a quantity of the light metal required for each light metal casting so as to compensate losses of a quantity of the light metal in said casting retort during a casting process and to prevent inflow of a protective gas;

performing a transformation of the liquid metal from a melting condition with a temperature of approximately 630°C to a solidification condition from a tool side to a lower region of a valve seat;

and supplying and withdrawing the protective gas by a differential pressure system.

It is emphasized that in accordance with the present invention the inventive method is carried out without interruption of individual casting process.

In connection with the Examiner's question with respect to the inventive method carried out "without interruption of individual casting process" applicant wishes to make the following remarks.

During the preparation of the metal quantity for each casting to be cast, a multiple of the metal quantity of the final casting is required. The reason is the occurrence of a metal quantity deficit in the casting retort, which makes impossible a proper-quality manufacture of the casting. This is the case when such liquid metal quantity is provided, which must correspond to the finished casting. The basic causes of the material losses are however not limited to the interior of casting retort (for example untightness), but for example in the event of occurring untightness of the casting tools. In contrast to the known casting process, in accordance with the inventive method, the manufacture of light metal castings requires an automatic tool ventilation. This can lead in certain conditions to untightness and thereby material losses caused by it. The exact loss quantity can not be determined in advance.

When in the prior art the control of the preparation quantity is performed by means of valves, material losses are generally not taken into consideration. Also, usually a suction action is produced due to the high

injection speed of the light metal which introduces the components of the protective gas into the material. Such introduction is caused by the adhesive friction of the contact surfaces between the liquid metal melt and the inner surfaces of the supply devices. The speed of the melt on the contact surfaces is thereby smaller than in the interior of the melt. Due to the thusly produced negative pressure and the resulting introduction of the protective gas, unusable metal castings are manufactured. Therefore a continuous monitoring of the operator during the course of the casting process is absolutely necessary.

In the casting retort, after the manufacture of each casting, always a rest of the supplied metal quantity is retained, which is completed by the newly supplied metal quantity within the next cycle. The available melting temperature is detected by the temperature sensor, and at reaching of the predetermined melting temperature, a signal is supplied to the valve control for automatically releasing the supply of the liquid metal into the die cavities of the casting mold.

In connection with the Examiner's question with respect to claim 5, applicant wishes to provide the following explanations. The solidification of the liquid light metal is performed not by one-time movement of the tool device, but instead substantially is performed at this

time point. As explained on page 9 of the specification, the rigidification process is performed by withdrawal of the thermal energy through the base support 5. it is further stated that the withdrawal of the thermal energy is performed by automatic withdrawal of the casting mold 19 from the feed system 4. which constitutes a secondary supporting tool. The rigidification process is performed at the beginning of the withdrawal.

In the present invention, losses of a quantity of the light metal in the casting resort are compensated during the casting process and also carried out to prevent inflow of a protective gas in the inventive method without interruption of individual casting process, as defined in claim 1.

It is therefore believed that the first ground for rejection should be withdrawn.

These features of the present invention are not disclosed in any of the references applied by the Examiner, neither in the primary reference which is a German patent document, nor in the patent to Callihan, nor in the U.S. patents to Jorn, Blum and Mueller, nor in the Japanese patent document.

Turning now to the references and in particular to the patent to Brown which is German reference '865, it can be seen that this reference, in column 2, line 35 discloses an apparatus, in which by the high injection speed of the light metal a suction is produced, which provides injection of the protective gas into the material. This is based on the condition that on the contact surfaces between the liquid metal melt and the inner surfaces of the supply device a static friction is produced.

The speed of the melt depending on the static friction on the contact surfaces is smaller than in the interior of the melt. The protective gas is aspirated by the produced negative pressure in the inner space. As a result, the manufactured metal casts are not usable. Without the intervention of the operator in the periodic course of the individual casting processes the manufacturing process is not possible.

When the method is performed in accordance with the present invention, the periodic course of the casting processes is possible since during the uninterrupted course of casting processes, material is supplied continuously. For each casting to be cast, depending on the losses in the casting retort 1 (material withdrawn from the casting retort 1)

a multiple of the required metal quantity for each casting is supplied. This is described in the specification.

German patent document DE '652, in contrast to the inventive method, discloses a melting- and dosing device. In accordance with the present invention a method is proposed for producing light metal castings. The negative pressure required for this is not generated by the dosing device of the reference. However, a protective gas atmosphere is provided. The dosing device serves for producing an accurate dosing for injection molding devices by means of the described chamber 44. The dosing is performed with the use of the force of gravity. After the dosing, the valve 36 is lowered by its own weight after the release by means of the lever device 50, 52. This dosing device is disclosed in Figure 1 of the reference. The reference does not teach the new features of the present invention.

The Japanese patent document JP 063 28559 discloses a method for coating a film surface with a layer having a special composition. The reference discloses a coating process which is performed without a cooperation with the melting container with the tool. The exit of the molten material is performed after the opening of the container unidirectionally in direction of the tool. A casting process in correspondence with the inventive process by producing a high pressure difference between a melting container arranged in the upper part of the device (casting retort 1), and the casting mold 19 arranged in the lower part of the apparatus is not provided here and it is not an objective of the invention disclosed in this reference. This reference also does not teach the new features of the present invention as now defined in claim 1.

The patent to Callihan which is applied by the Examiner as showing multiple quantity of molten metal, does not disclose the new features of the present invention. In particular it does not disclose a method of producing light metal castings in which a production process is performed continuously in a closed loop without interruption of individual casting process with a pressure differential between the casting retort and the casting mode, as well as other features of the present invention. The same is true with respect to the U.S. patent to Jorn, Blum, and Muller. These references do not teach the new features of the present invention as defined in claim 1.

The Examiner rejected the claims as obvious over the combination of several references, in particular six references. It is believed that the combination of the references proposed by the Examiner can not be considered as justifiable.

In connection with this, it is believed to be advisable to cite some legal decisions which are pertinent to the situation of the present application. In ATD Corp. v. Lydall, Inc., 48 USPQ 2d 1321, 139 (Fed. Cir. 1998) it was stated:

> "Determination of obviousness can not be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention. There must be a teaching or suggestion within the prior art or within the general knowledge of a person of ordinary skill of the invention to look to particular sources of information, to select particular elements and to combine them in the way they were combined by the inventor".

Definitely, there are no hints, teachings or suggestions, within the references to combine them.

Also, in re Blamer, Civ. App. no. 93-1108, Slip Op at 3-4 (Fed. Cir. September 21, 1993) it was stated:

> The Examiner concluded that applicant's invention would have been obvious in light of twelve references. The Board correctly

> stated that the Examiner's reliance on so many references was "overkill".

It is believed that in the present application the Examiner's reliance on so many references could also be considered as "overkill" and therefore was not justified.

In order to arrive at the applicant's from the combination of the references proposed by the Examiner, if for some unknown reasons a person of ordinary skill in the art combined the references, it would not be sufficient just to combine the references, but instead the references have to be fundamentally modified by including into them the new features which were first proposed by the appellant. However, it is known that in order to arrive at a claimed invention, by modifying the references the cited art must itself contain a suggestion for such a modifcication.

This principle has been consistently upheld by the U.S. Court of Customs and Patent Appeals which, for example, held in its decision in re Randol and Redford (165 USPQ 586) that

> Prior patents are references only for what they clearly disclose or suggest, it is not a proper use of a patent as a reference to modify its structure to one which prior art references do not suggest.

Also, as explained herein above, the present invention provides for the highly advantageous results which can be accomplished

by the methods disclosed in the references. It is well known that in order to support a valid rejection in the art must also suggest that it would accomplish applicant's results. This was stated by the Patent Office Board of Appeals, in the case Ex parte Tanaka, Marushma and Takahashi (174 USPQ 38), as follows:

> Claims are not rejected on the ground that it would be obvious to one of ordinary skill in the art to rewire prior art devices in order to accomplish applicant's result, since there is no suggestion in prior art that such a result could be accomplished by so modifying prior art could .

In view of the above presented remarks and amendments, it is believed that claim 1, the broadest claim on file, should be considered as patentably distinguishing over the art and should be allowed.

As for the rejected dependent claims, these claims depend on claim 1, they share its presumably allowable features, and they should be allowed.

It is believed that this is how the second issue on appeal has to be resolved.

Reconsideration of the present application, reversal of the Examiner's rejection of the claims, and allowance of the present application is most respectfully requested.

Respectfully submitted,

Michael J. Striker
Attorney for Applicant
Reg. No. 27233

CLAIMS APPENDIX

1. A method of producing light metal castings composed of magnesium or magnesium alloys, comprising the steps of supplying a liquid metal first to a casting retort; pumping gas under pressure into the casting retort so as to press the liquid metal into a preliminarily evacuated casting mold; performing a production process continuously without interruption of individual casting process with a pressure differential between the casting retort and the casting mold; heating of the liquid metal in a lower part of a melting device which adjoins a feed system; after reaching a melting temperature approximately 630°, providing a connection between said casting retort and said casting mold through a valve system over a short time without connection with outside; selecting a quantity of the supplied liquid light metal to be a multiple of a quantity of the light metal required for each light metal casting so as to compensate losses of a quantity of the light metal in said casting retort; performing a transformation of the liquid metal from a melting condition with a temperature of approximately 630°C to a solidification condition; and supplying and withdrawing a protective gas by a differential pressure system.

2. A method as defined in claim 1; and further comprising performing an additional supply of solid light metal by a sluice device

under an available pressure difference between outer atmosphere and an inner pressure in the melting device.

3. A method as defined in claim 1; and further comprising supplying the light metal selectively in a liquid form through a metal supply conduit and/or as a solid light metal through a sluice device.

4. A method as defined in claim 1; and further comprising selecting a quantity of the supply light metal to amount to a multiple of a light metal quantity for a light metal parts to be produced.

5. A method as defined in claim 1; and further comprising solidifying the liquid light metal by a movement of a tool device away.

6. A method as defined in claim 1; and further comprising supplying and withdrawing of the protective gas through a pressure intensifier, and compensating pressure losses by protective gas additional supply.

7. A method as defined in claim 1; and further comprising performing the solidification of the light metal by lifting a casting retort and thereafter placing the casting retort on a tool device of a next workpiece to be treated.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by accord or the board in any proceedings pursuant to paragraph "Related Appeals and Interferences" of the Brief on Appeal".